

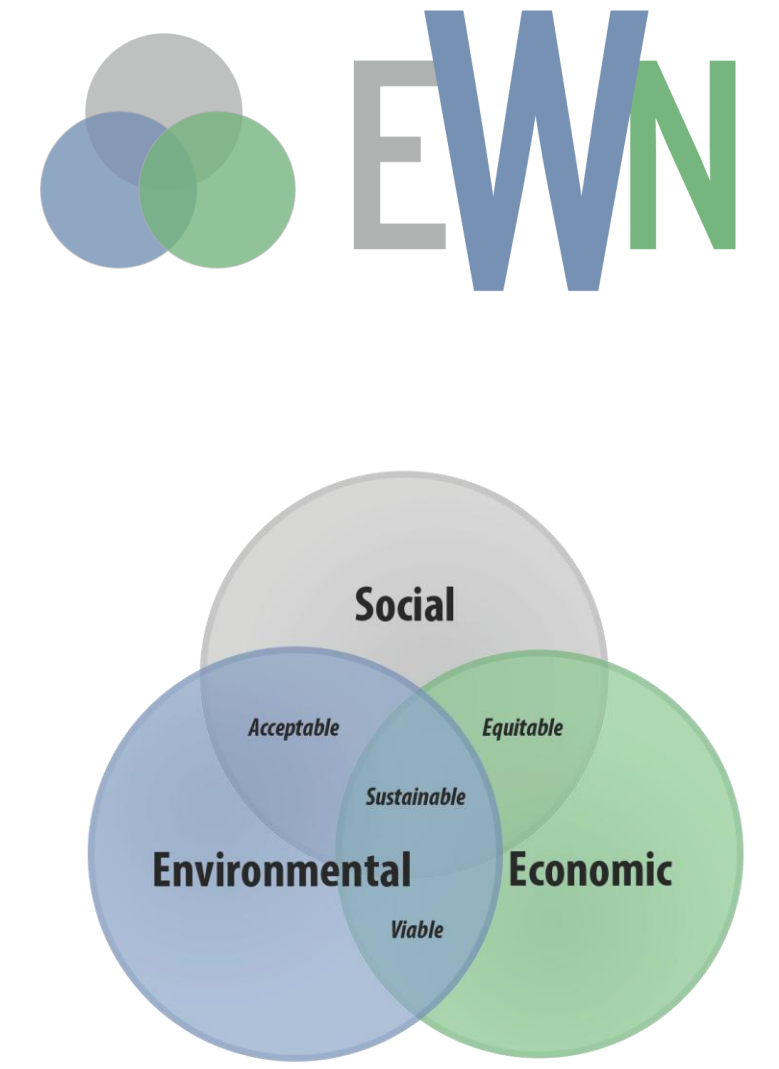
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Engineering With Nature Demonstrates Collaboration Across ERDC, USACE, and Non-Governmental Organizations

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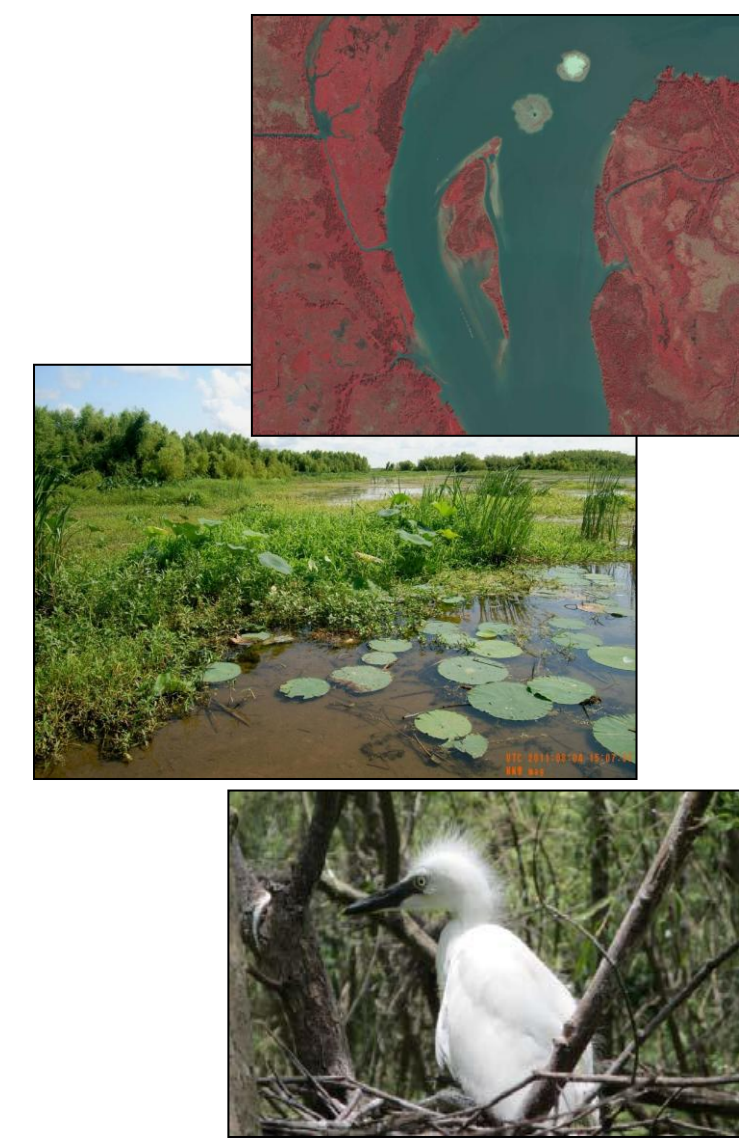
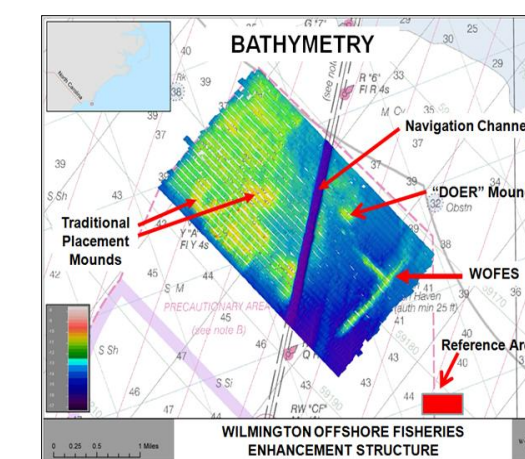
Engineering With Nature (EWN) is defined as the *intentional* alignment of natural and engineering processes to efficiently and sustainably deliver economic, environmental and social benefits through collaborative processes. EWN is based on four key elements including: 1) Science and engineering that produces operational efficiencies; 2) Using natural systems and processes to maximum benefit; 3) Broaden and extend the benefits provided by projects to include economic, environmental and social benefits; and 4) Science-based collaborative processes to engage, organize and focus interests, stakeholders, and partners. EWN represents a collaboration among several ERDC research and technology programs.



EWN Examples

Wilmington Offshore Fisheries Enhancement Structure (Wilmington, NC)

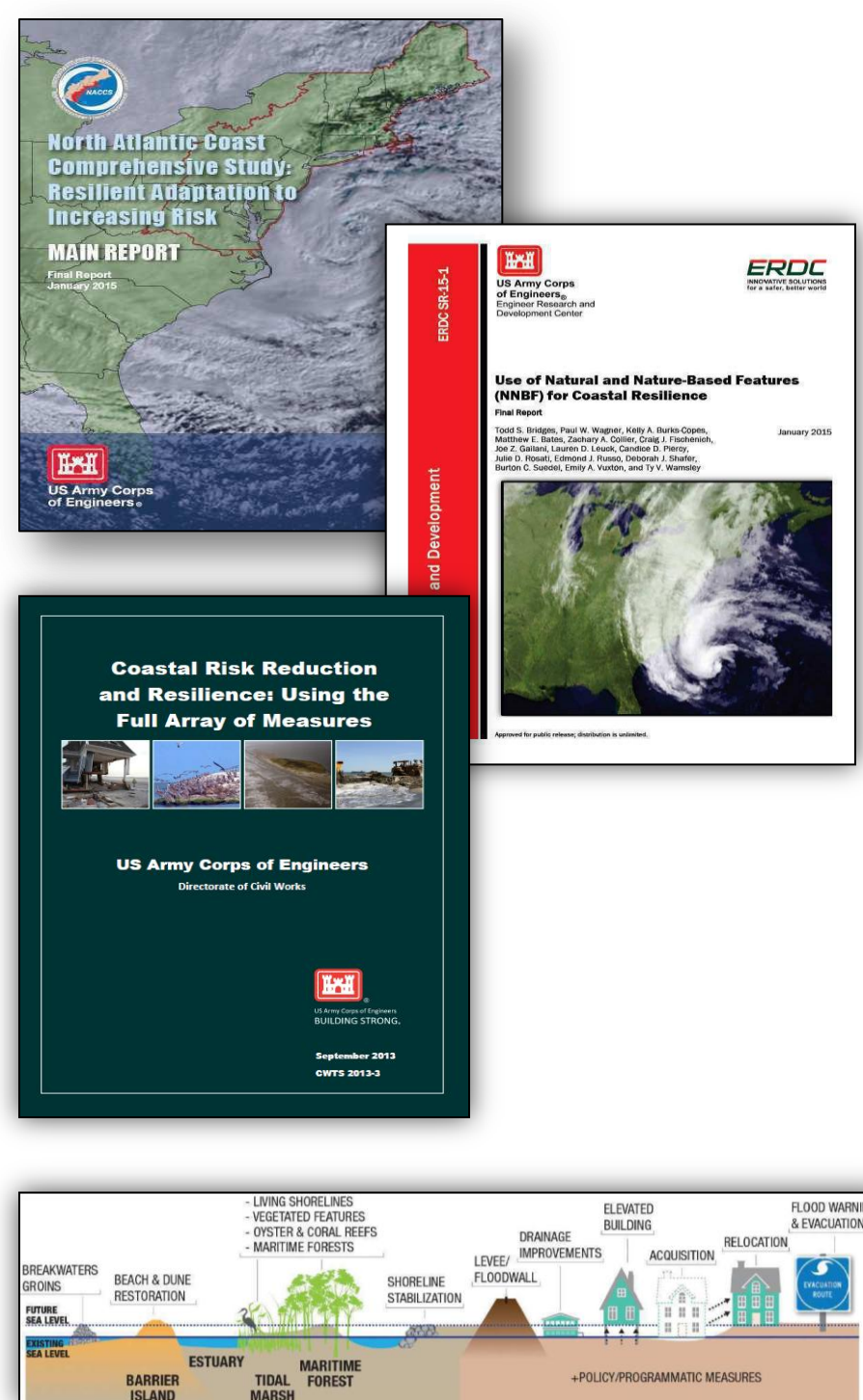
- Created in 1994-1997 from 764,600 cubic meters of limestone dredged as part of the Wilmington channel deepening
- Located three nautical miles off of the mouth of the Cape Fear River in North Carolina
- Location and design of the reef involved extensive participation by stakeholders and the North Carolina Department of Environment and Natural Resources supported the project as a local sponsor
- Produced significant social benefits as a popular destination for fishing tournament participants



Island Creation along the Atchafalaya River (Morgan City, LA)

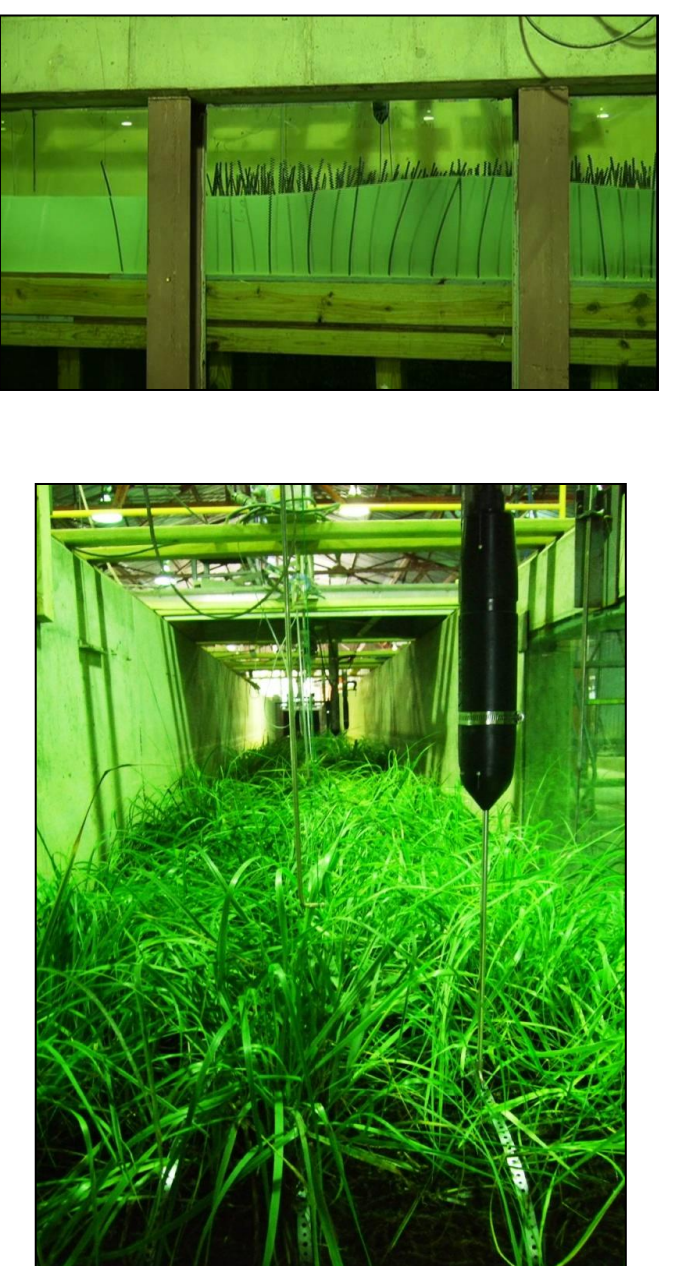
- As placement sites continue to become exhausted, there was a need for more creative placement alternatives in the Gulf Coast
- In 2002, strategic placement of the sediment dredged from Horseshoe Bend occurred at the mid-river open water placement area
- Strategic placement of between 0.5 to 1.8 million cubic yards of sediment was conducted every 1-3 years developing an ~35 ha island mid-river
- Producing significant environmental and economic benefits
- Project recognized by Western Dredging Association with 2015 Award for Environmental Excellence

EWN Collaborates Across ERDC



In response to the impacts of Hurricane Sandy, a multi-disciplinary team of 30 engineers and scientists (ERDC, CHL, IWR) contributed to the North Atlantic Coast Comprehensive Study. The team produced a technology report that identifies opportunities to integrate Natural and Nature-Based Features with structural and non-structural measures to provide multiple lines of defense against storms and sea level rise, generating a full array of relevant economic, environmental and social ecosystem goods and services.

What are the engineering benefits of wetlands with respect to waves? Laboratory R&D including flume studies are being performed in the 10 ft flume facility at ERDC. Sediment processes are examined through field studies allowing for real-time measurements. Wave attenuation was found to: 1) increase with stem density; 2) increase with submergence ratio; and 3) slightly increase with incident wave height. The results will be used to update STWAVE. This work is a collaborative effort between DOER and Flood & Coastal programs.



EWN Collaborates Across USACE

The EWN initiative has gained two 'Proving Grounds': the USACE Galveston and Buffalo districts. These districts have committed, at the Commander and Deputy District Engineer level, to incorporate EWN principles and practices (to the extent possible) in current and future projects. Each district hosted an initial kick-off workshop where participants worked in collaborative groups along with the EWN Leadership Team to identify research and development project opportunities, knowledge gaps and potential collaborators and partners.



EWN Collaborates With NGOs and Other Agencies

The EWN initiative also has strong connections with other federal and state government and NGOs. The objective of the Ashtabula Breakwater Tern Habitat project is to incorporate EWN into a routine breakwater maintenance activity to provide a tangible demonstration of the concept. A successful demonstration will provide great potential to increase sustainability and project benefits, often with minimal added cost. Design of the tern nesting site and future monitoring in Ashtabula, Ohio involved collaboration with the Nature Conservancy, Ohio Department of Natural Resources, New York Department of Environmental Conservation, and the U.S. Environmental Protection Agency (Great Lakes Restoration Initiative).



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